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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,898	09/14/2006	Hans Zou	US040151US2	4318

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P.O. BOX 3001
BRIARCLIFF MANOR, NY 10510

EXAMINER	
LOVELL, LEAH S	

ART UNIT	PAPER NUMBER
2885	

MAIL DATE	DELIVERY MODE
05/13/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/598,898	ZOU ET AL.	
	Examiner	Art Unit	
	LEAH S. LOVELL	2885	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7,8,10 and 12-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7,8,10 and 12-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *30 Jan 2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. The amendment submitted 5 February 2009 has been entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. It is unclear what is meant by "a single extended LED." From the specification, particularly page 5, lines 5 and 6, it is believed that "an extended LED" indicates the use of a single LED with a light guide to distribute the light from the single LED over an extended surface. For the purposes of the office action, it will be assumed that the "extended" LED is one the using a single LED with a light guide to distribute the light from the single LED over an extended surface.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 2, 8, 14 and 18 are rejected under 35 U.S.C. 102(a) as being anticipated by Schevardo (EP 1 496 380).

Regarding claim 1, Schevardo discloses an illumination device, comprising:

> an incoherent solid state light source [8] adapted to emit light over at least one light emission surface and having a total light emission surface area S_o [see figure A below]; and

a solid light guide [as indicated in figure A below] having an entrance aperture [as indicated in figure A below] adapted to receive the light from the incoherent solid state light source [8] and a light extraction aperture [as indicated in figure A below] adapted to output the light from the incoherent solid state light source [8] and a first surface [as indicated in figure A below] that is configured to reflect the light within the solid light guide by total internal reflection [as indicated in figure A below; it is clear to those having ordinary skill in the art that since the solid light guide is disposed within a solid, no light escapes the solid light guide indicating total internal reflection], and

a light extraction device [as indicated in figure A below] adapted to extract the light from the solid light guide and output the light from the incoherent solid state light source,

wherein the light extraction device has a refractive index that substantially matches a refractive index of the solid light guide [the light extraction device and the solid light guide are the same material, therefore, having the same refractive index], and includes a surface area S_1 that is optical contact with the solid light guide and extracts the light by preventing the total internal reflection at the surface area S_1 [as indicated in figure A below]; and the surface area S_1 of the light extraction device is smaller than the surface area S_o [as indicated in figure A below].

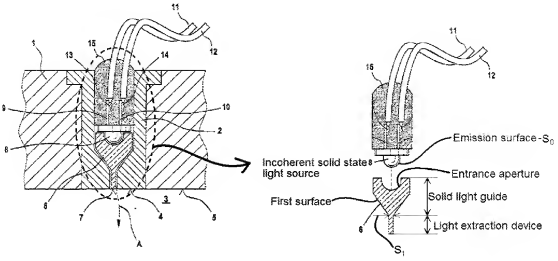

FIGURE A: Figure from Schevardo modified to clearly indicate the limitations of the claim(s).

In regard to claim 2, Schevardo discloses the incoherent solid state light source [8] includes a single extended LED [paragraph 16 of the translated text].

In regard to claim 8, Schevardo discloses an illumination device, comprising:

an incoherent solid state light source [8] adapted to emit light over at least one light emission surface and having a total light emission surface area S_0 [shown in figure A above];

a light circulation device [6] including a solid light guide [as indicated in figure A above] that includes at least one light receiving surface [as indicated in figure A above] adapted to receive the light from the incoherent solid state light source [as shown in figure A above], and at least one light reflecting surface adapted to reflect the light by total internal reflection [as indicated in figure A above; it is clear to those having ordinary skill in the art that since the solid light guide is disposed within a solid, no light escapes the solid light guide indicating total internal reflection]; and

light extraction means [as indicated in figure A above] for extracting the light from the reflecting surface of the light circulation device at the light extraction area,

wherein the light extraction means has a light extraction surface of area S_1 [as indicated in figure A above] in contact with the reflecting surface, and has a refractive index that substantially matches a refractive index of the light circulation device thereby extracting the light by preventing the total internal reflection at the light extraction surface [the light extraction device and the solid light guide are the same material, therefore, having the same refractive index], and S_1 is smaller than S_0 [as indicated in figure A above].

Regarding claim 14, Schevardo discloses the light extraction means [as indicated in figure A above] includes a prismatic optical component [see figure A above].

In regard to claim 18, Schevardo discloses the light circulation device [6] has a cross-section who thickness is less near the light extraction area than at the light receiving surface [see figure A above].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 3 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schevardo (EP 1 496 380).

Regarding claim 3, Schevardo discloses the claimed invention as indicated above. However, Schevardo does not disclose an array of LEDs. It would have been obvious to one of ordinary skill in the art at the time of the invention to try an array of LEDs for the incoherent light source in an attempt to improve the desirability of the light device of Schevardo, as a person with ordinary skill has good reason to pursue the known options within his or her technical grasp. In turn, one would have been motivated to do so because it is well known in the art that an array of LEDs--particularly an array of red, green and

blue LEDs—provide a purer white light which is highly desirable. *KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (2007).*

In regard to claim 20, Schevardo discloses the claimed invention except for the solid state light source being an extended LED. It would have been an obvious matter of design choice to choose an extended LED since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 (CPA 1955). One would be motivated to do so because a larger surface area LED would provide more light than a standard size LED.

8. Claims 1-5, 7, 8, 10, 13-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (US 6,011,602) in view of Umemoto et al. (US 6,590,625).

Regarding claim 1, Miyashita discloses an illumination device, comprising:

an light source [22] adapted to emit light over at least one light emission surface [seen in figure B below or figure 1; unnumbered surface where light leaves the light source] and having a total light emission surface area S_0 [indicated in figure B below]; and

a solid light guide [21] having an entrance aperture [25] adapted to receive the light from the light source [shown in figure B below and figure 1] and a first surface [24] that is configured to reflect the light within the solid light guide by total internal reflection [seen in figure B below and figure 1], and

a light extraction device [as indicated in figure B below; 23] adapted to extract the light from the solid light guide and output the light from the light source [seen in figure B below and in figure 1],

wherein the light extraction device has a refractive index that substantially matches a refractive index of the solid light guide [figures 1 and 9; column 11, lines 1-9], and includes a surface area S_1 [as indicated in figure B below] that is in optical contact with the solid light guide [21] and extracts the light by preventing the total internal reflection at the surface area S_1 [seen in figure B below and figure 1] and the surface

area S_1 of the light extraction device is smaller than the surface area S_0 [the light extraction devices are substantially smaller than an output surface of any cylindrical light source, which clearly renders the surface area S_1 of the light extraction device smaller than the surface area S_0 of the light emission surface area].

However, Miyashita only discloses the light source as a cylindrical light source [column 10, lines 52-54] and does not disclose the light source as an incoherent *solid state* light source. Umemoto discloses the equivalence of fluorescent tube lamps, single LED, and an array of LEDs--all of which are incoherent light sources--for a light source of a backlight device [column 9, lines 38-47]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an incoherent solid state light source (or LED) as the light source of Miyashita. One would have been motivated to do so because it is well-known in the art that LEDs are inexpensive to purchase/replace, have a longer life, burn brighter, and consume less power while providing a white light (desired for backlights).

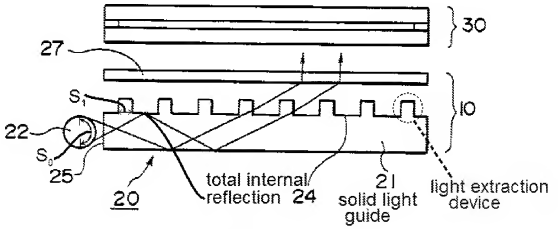

FIGURE B: Figure 1 of Miyashita to clearly indicate the limitations.

In regard to claim 2,Miyashita, as modified by Umemoto, discloses the incoherent solid state light source includes a single extended LED [column 9, lines 38-47 of Umemoto].

Regarding claim 3, Miyashita, as modified by Umemoto, discloses the incoherent solid state light source includes an array of LEDs [column 9, lines 38-47 of Umemoto].

In regard to claim 4, Miyashita discloses the claimed invention as indicated above and the surface S_1 having a rectangular shape [figure 1 or figure B above]. However, Miyashita does not disclose an aspect ratio of 16:9. It would have been an obvious matter of design choice to have an aspect ratio of 16:9 since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 ((CPA 1955). One would be motivated to do so because 16:9 is well-known in the art as a common aspect ratio to produce a sharp, clear image.

Regarding claim 5, Miyashita discloses an illumination device, comprising:

an light source [22] adapted to emit light over at least one light emission surface [seen in figure B above or figure 1; unnumbered surface where light leaves the light source] and having a total light emission surface area S_o [indicated in figure B above];

a solid light guide [21], coupled to the light source, that includes a reflective layer [column 10, lines 57-59 and reference number 58] disposed directly on and covering the incoherent solid state light source [column 10, lines 57-59; figure 5] and a first surface [24] that reflects the light within the light guide by total internal reflection [seen in figure B above and figure 1]; and

a refractive index matching material [23; as indicated in figure B above] disposed on a surface area S_1 [as shown in figure B above] of the first surface [24] that extracts the light from the solid light guide by preventing the total internal reflection at the area S_1 and outputs the light from the light source [as seen in figure B above and figure 1],

wherein the surface area S_1 of the opening of the reflective layer is smaller than the surface area S_0 [the light extraction devices are substantially smaller than an output surface of any cylindrical light source, which clearly renders the surface area S_1 of the light extraction device smaller than the surface area S_0 of the light emission surface area].

However, Miyashita only discloses the light source as a cylindrical light source [column 10, lines 52-54] and does not disclose the light source as an incoherent *solid state* light source. Umemoto discloses the

equivalence of fluorescent tube lamps, single LED, and an array of LEDs--all of which are incoherent light sources--for a light source of a backlight device [column 9, lines 38-47]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an incoherent solid state light source (or LED) as the light source of Miyashita. One would have been motivated to do so because it is well-known in the art that LEDs are inexpensive to purchase/replace, have a longer life, burn brighter, and consume less power while providing a white light (desired for backlights).

Regarding claim 7, Miyashita discloses the claimed invention as indicated above and the surface S_1 having a rectangular shape [figure 1 or figure B above]. However, Miyashita does not disclose an aspect ratio of 16:9. It would have been an obvious matter of design choice to have an aspect ratio of 16:9 since such a modification would have involved a mere change in the size of a component. A change in size is generally recognized as being within the level of ordinary skill in the art. *In re Rose*, 105 USPQ 237 ((CPA 1955). One would be motivated to do so because 16:9 is well-known in the art as a common aspect ratio to produce a sharp, clear image.

In regard to claim 8, Miyashita discloses an illumination device, comprising:

an light source [22] adapted to emit light over at least one light emission surface [seen in figure B above or figure 1; unnumbered surface where light leaves the light source] and having a total light emission surface area S_o [indicated in figure B above];

a light circulation device including a solid light guide [21] that includes at least one light receiving surface [25] adapted to receive the light from the light source [seen in figure B above and figure 1], and at least one light reflecting surface [24] adapted to reflect the light by total internal reflection [seen in figure B above and figure 1], and

light extraction means [23, as indicated in figure B above] for extracting the light from the reflecting surface of the light circulation device [as indicated in figure B above],

wherein the light extraction means [23, as indicated in figure B above] has a light extraction surface of area S_1 [as indicated in figure B above] in contact with the reflecting surface [seen in figure B above], and has a refractive index that substantially matches a refractive index of the light circulation device thereby extracting the light by preventing the

total internal reflection at the light extraction surface [figures 1 and 9; column 11, lines 1-9], and S_1 is smaller than S_0 [the light extraction devices are substantially smaller than an output surface of any cylindrical light source, which clearly renders the surface area S_1 of the light extraction device smaller than the surface area S_0 of the light emission surface area].

However, Miyashita only discloses the light source as a cylindrical light source [column 10, lines 52-54] and does not disclose the light source as an incoherent *solid state* light source. Umemoto discloses the equivalence of fluorescent tube lamps, single LED, and an array of LEDs--all of which are incoherent light sources--for a light source of a backlight device [column 9, lines 38-47]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use an incoherent solid state light source (or LED) as the light source of Miyashita. One would have been motivated to do so because it is well-known in the art that LEDs are inexpensive to purchase/replace, have a longer life, burn brighter, and consume less power while providing a white light (desired for backlights).

Regarding claim 10, Miyashita discloses the light circulation device [21] includes a reflective material [58] disposed on a surface of the light guide that does not support total internal reflection [figure 5].

In regard to claim 13, Miyashita discloses the claimed invention as indicated above. However, Miyashita does not disclose the light extraction means includes a compound parabolic collimator. One of ordinary skill in the art would have been led to the recited compound parabolic collimator through routine experimentation and optimization. Applicant has not disclosed that the shape is for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another shape. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). See also

MPEP 2144.04(IV)(B). One would have been motivated to do so because the compound parabolic structure would result in a desired, even brightness.

Regarding claim 14, Miyashita discloses the light extraction means [23] includes a prismatic optical component [figure B above or figure 1].

In regard to claim 15, Miyashita discloses a reflective polarizer [440] disposed in an optical path between the light extraction area and the light extraction means, wherein the light circulation device includes at least one diffusing reflector disposed at a sidewall thereof [column 7, lines 3-35].

Regarding claim 16, Miyashita discloses the light circulation device includes at least one specular reflector [58] disposed at a sidewall thereof, said illumination device further comprising: a reflective polarizer disposed in an optical path between the light extraction area and the light extraction means[column 7, lines 3-35]; and a quarter wavelength foil in an optical path between the specular reflector and the reflective polarizer [column 7, lines 3-35].

Regarding claim 17, Miyashita, as modified by Umemoto, discloses the light circulation device includes at least two light receiving surfaces [seen in figure 5] and the light source [22 or, in the case of figure 5, 56a and 56b] includes at least two light-emitting components, each light-emitting component being disposed adjacent to and confronting a corresponding one of the light receiving surfaces [figure e5].

Regarding claim 19, Miyashita, as modified by Umemoto, discloses:

> a second incoherent solid state light source [figure 5, 56a and 56b] adapted to emit light over at least a second light emission surface [of 56b],
>
> wherein the light circulation device [51] includes at least a second light receiving surface [52b] adapted to receive the light from the second incoherent solid state light source [figure 5 of Miyashita].

However, Miyashita, as modified by Umemoto, wherein the two incoherent solid state light sources [22 as modified by Umemoto] each emit light having a different spectral color. It would have been obvious to one of ordinary skill in the art at the time of the invention to try each light source of Miyashita, as modified by Umemoto, as a different spectral color in an attempt to improve the function of the backlight device, as a person with ordinary skill has good reason to pursue the known options within his or her technical

grasp. In turn, one would have been motivated to do so because Umemoto discloses the use of an array of LEDs as the light source, and it is well-known within the art to use lights of different spectral color to obtain a purer white light. *KSR International Co. v. Teleflex Inc., 82 USPQ2d 1385 (2007).*

In regard to claim 20, Miyashita, as modified by Umemoto, discloses the incoherent solid state light source includes a single extended LED [column 9, lines 38-47 of Umemoto; wherein 'extended' indicates the use of a single LED with a light guide to distribute the light from the single LED over an extended surface—which is a common arrangement in the backlight art].

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Miyashita et al. (US 6,011,602) and Umemoto et al. (US 6,590,625) as applied to claim 8 above, and further in view of Mol et al. (US 5,856,855).

Regarding claim 12, Miyashita, as modified by Umemoto, discloses the claimed invention as indicated above. However, Miyashita does not disclose the light extraction means includes a light collimating structure. Mol discloses light extraction means [33] as a light collimating structure [column 9, lines 10-23]. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use the extraction means of Mol in Miyashita. One would have been motivated to do so because the collimating structure of Mol would result in a desired even brightness.

Response to Arguments

10. Applicant's arguments with respect to claims 1-5, 7, 8, 10, and 12-20 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following are cited as having the light extraction device has a refractive index that substantially matches a refractive index of the solid light guide, and includes a surface area S_1 that is in optical contact

with the solid light guide and extracts the light by preventing the total internal reflection at the surface area S_1; and the surface area S_1 of the light extraction device is smaller than the surface area S_0;

- Tai et al. (US 6,092,904)
- Yoo (US 7,018,087)
- Lee et al. (US 7,160,017)
- Bastiaansen et al. (US 2003/0058386)
- Colgan et al. (US 2003/0214615)

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LEAH S. LOVELL whose telephone number is (571)272-2719. The examiner can normally be reached on Monday through Friday 8 a.m. until 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jong-Suk (James) Lee can be reached on (571) 272-7044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leah Lovell
Examiner, AU 2885
11 May 2009

/Jong-Suk (James) Lee/
Supervisory Patent Examiner
Art Unit 2885